

116001

1/6/81

1. Chemical:

Triclopyr (Dowco 233)

2. Formulation:

98.9%

3. Citation:

Wildlife International (1979). One-Generation Reproduction Study - Bobwhite Quail. Project No. 103-141. December 28, 1979. Acc. No. 242368.

4. Reviewed By:

Carol Matti Natella
Wildlife Biologist
EEB/HED

5. Date Reviewed:

January 6, 1981

6. Test Type:

Avian Reproduction - Bobwhite Quail

7. Reported Results:

Statistical analysis of the reproductive parameters showed no statistically significant reproductive impairment at the dosage levels tested. There was, however, a statistically significant ($p.<.01$) reduction in eggshell thickness at the 200 ppm dosage level.

8. Reviewer's Conclusions:

The study is scientifically sound and shows no statistically significant reproductive impairment at the dosage levels tested. The study does fulfill the requirements for an avian reproduction study on an upland game bird.

Materials/Methods

Test Procedures

Protocol generally follows the proposed EPA guidelines of March 7, 1980. Some specifics of the study include: age of test birds at initiation of study - 5 months; Duration of adult exposure prior to egg laying - 11 weeks; Duration of egg collection - 8 weeks; Test initiation April 10, 1979; Test termination - September 28, 1979; Test termination - September 28, 1979; Dosage levels - control, 100 ppm, 200 ppm, and 500 ppm; Birds per pen - 1 cock, 2 hens; number of pens per treatment level - 12.

The test material and corn oil were incorporated into aliquots of basal diet. The concentrates were frozen until utilized for weekly diet preparation. The adult ducks in both the control and experimental groups received the appropriate diets ad libitum for the duration of the study. The photoperiod for the first seven weeks of the study was nine hours of light per day. The photoperiod was then increased to 17 hours of light per day, and was maintained at that duration until the termination of the study. Throughout the study the temperature was maintained between 65° and 80°F.

Throughout incubation the temperature was maintained at 99.5°F + 0.1°F with a wet bulb humidity index of 87.0° + 1.0°F. When the eggs were transferred to the hatcher, the temperature was lowered to 99.0°F + 0.1°F, and the wet bulb humidity was raised to 94.0°F + 1.0°F.

Statistical Analysis

The method of Cochran (Analysis of Variance for Percentages based on Unequal Numbers, JASA, 1943, Vol. 38, pp 297-301) was used to evaluate these data. The two-way Analysis of Variance, the Student's t-test, and the Chi-Square test were utilized where appropriate.

Evaluation of the reproductive data and statistical analysis of the reproductive parameters: eggs laid, eggs cracked, viable embryos, live three-week embryos, normal hatchlings, body weight-hatchlings, 14 day-old survivors, body weight-14 day-old survivors, and egg weights demonstrate that the test material caused no statistically significant reproductive impairment at the dosage levels tested. There was a statistically significant ($p < .01$) reduction in eggshell thickness at the 200 ppm dosage level, but no statistically significant effect was evidenced at either the 100 ppm or 500 ppm dosage levels, and there was no statistically significant effect on the reproductive success of the birds at the 200 ppm dosage level.

Discussion/Results

TABLE 1A
REPRODUCTIVE DATA - BOBWHITE QUAIL

	Controls	DOWCO 233 (ppm)		
		100	200	500
Eggs Laid	706	778	522	767
Eggs Cracked	33	71	49	46
Eggs Set	629	662	431	679
Viable Embryos	502	504	332	561
Live Three-Week Embryos	485	472	298	544
Normal Hatchlings	308	303	227	309
14 Day-Old Survivors	236	215	188	233
Eggs Laid/Hen in 8 Weeks*	29	32	22	32
14 Day-Old Survivors/Hen*	10	9	8	10

*Based on 24 hens.

TABLE 1B
REPRODUCTIVE SUCCESS DATA - BOBWHITE QUAIL

	Controls	DOWCO 233 (ppm)		
		100	200	500
Eggs Laid of Theoretical Maximum (%)	53	58	39	57
Eggs Cracked of Eggs Laid (%)	5	9	9	6
Viable Embryos of Eggs Set (%)	80	76	77	83
Live Three-Week Embryos of Viable Embryos (%)	97	94	90	97
Normal Hatchlings of Live Three-Week Embryos (%)	64	64	76	57
14 Day-Old Survivors of Normal Hatchlings (%)	77	71	83	75
14 Day-Old Survivors of Eggs Set (%)	38	32	44	34

Mature bobwhite quail receiving Triclopyr at dietary concentrations of 100 ppm, 200 ppm, and 500 ppm showed no symptoms of toxicity or behavioral abnormalities for the duration of the study. Mortalities occurred as follows: Control group; one hen - week 12, one hen - week 16. 100 ppm group; one hen - week 17. 200 ppm group; one hen - week 12, one hen - week 15, two hens - week 17, and two hens - week 18. 500 ppm group; one hen - week 19. All mortalities occurred during the stress of egg production and, in all instances, no gross compound related abnormalities were noted upon necropsy.

Reviewer's Evaluation

A. Test Procedure

Generally, the test procedure complies with the recommended EPA 1980 protocol. There was, however, a higher than normal incidence in the controls of eggs cracked - 5% (normal value 0.6-2.0%).

B. Statistical Analysis

Two contingency tables were set up ("Contab" program). The number of 14 day-old survivors was compared with the number "dead", that is, eggs laid minus 14 day-old survivors. The control was compared with the sum of all treatment groups and with the 200 ppm treatment group.

	<u>Alive</u>	<u>Dead</u>
Control	236	470
All treatment groups	636	1431

	<u>Alive</u>	<u>Dead</u>
Control	236	470
200 ppm	188	334

Chi-square tests on these values showed no significant ($p. = .05$) between the controls and the treatment groups.

An analysis of variance was performed on the number of eggs laid for all three treatment groups and the controls. No dose-related response was noted.

	<u>Mean</u> (# eggs/pen)	<u>Grouping</u>
100 ppm	64.8	A
500 ppm	63.9	A
Control	58.8	A B
200 ppm	43.5	B

The EEB was not able to duplicate the exact procedure used by the author of this study. However, using the statistical methods outlined above, the EEB's conclusions are the same as those of the author - that no statistically significant reproductive impairment exists at the dosage levels tested.

C. Conclusions

1. Category: Core
2. Rationale: N/A
3. Repairability: N/A

COMMAND ?

list 200/1

200.

201.

202.

VARIABLES TO BE USED

203.

1 EXPOSURE 2 RESPONSE

204.

0 BEFORE TRANSFORMATION

205.

VARIABLE NO. NAME	MINIMUM LIMIT	MAXIMUM LIMIT	MISSING CODE	CATEGORY CODE	CATEGORY NAME	INTERVAL RANGE GREATER THAN	LESS THAN OR EQUAL TO
0 1 EXPOSURE				1.00000	CONTROL		
0 2 RESPONSE				2.00000	CHEMICAL		
				1.00000	ALIVE		
				2.00000	DEAD		

2

212.

TABLE NO. 1

EXPOSURE(VAR 1) VS RESPONSE(VAR 2)

213.

214.

215.

CELL FREQUENCY COUNTS

216.

0

RESPONSE(VAR 2)

217.

218.

219.

	ALIVE	DEAD	
	1.00	2.00	TOTAL

220.

221.

EXPOSURE CONTROL	1.00	I	236	470	I	706	<i>Control</i>
(VAR 1) CHEMICAL	2.00	I	188	334	I	522	<i>200 ppm</i>
		TOTAL	424	804	I	1228	

222.

223.

224.

225.

226.

0

MINIMUM NONZERO EXPECTED VALUE IS 180.235

---- ALL STATISTICS ARE COMPUTED USING THE ORIGINAL CELL FREQUENCIES
EXCLUDING ROWS AND/OR COLUMNS WHICH ARE ZERO.

227.

228.

229.

230.

231.

232.

233.

STATISTIC

234.

PEARSON CHISQUARE

VALUE 0.889 D.F. 1 PROB. 0.3458

235.

0

STATISTIC
YATES' CORRECTED CHISQUARE

VALUE 0.778 D.F. 1 PROB. 0.377

236.

1 PAGE 3

237.

OBMDP1F - TWO-WAY FREQUENCY TABLES--MEASURES OF ASSOCIATION

238.

HEALTH SCIENCES COMPUTING FACILITY

239.

UNIVERSITY OF CALIFORNIA, LOS ANGELES 90024

240.

PROGRAM REVISED NOVEMBER 1979

241.

MANUAL REVISED -- 1979

242.

COPYRIGHT (C) 1979 REGENTS OF THE UNIVERSITY OF CALIFORNIA

191. NUMBER OF CASES TO READ 200
192. CASE LABELING VARIABLES
193. LIMITS AND MISSING VALUE CHECKED BEFORE TRANSFORMATIONS
194. BLANKS ARE ZEROS 5
195. INPUT UNIT NUMBER 5
196. REWIND INPUT UNIT PRIOR TO READING . . DATA . . NO
197. NUMBER OF WORDS OF DYNAMIC STORAGE 18432
198. INPUT FORMAT
199. (4F4.0)
200.
201.

202. VARIABLES TO BE USED

203. 1 EXPOSURE 2 RESPONSE

204. 0 BEFORE TRANSFORMATION

205. 0 VARIABLE ^K 206. NO. NAME	205. MINIMUM 206. LIMIT	205. MAXIMUM 206. LIMIT	205. MISSING 206. CODE	205. CATEGORY 206. CODE	205. CATEGORY 206. NAME	205. INTERVAL RANGE 206. GREATER THAN 207. OR EQUAL TO
207. 0 1 EXPOSURE				1.00000	CONTROL	
208. 0 2 RESPONSE				2.00000	CHEMICAL	
				1.00000	ALIVE	
				2.00000	DEAD	

210. 2
211. 1
212. TABLE NO. 1 EXPOSURE(VAR 1) VS RESPONSE(VAR 2)

213. 214. CELL FREQUENCY COUNTS

215. 216. ----- RESPONSE(VAR 2)

217. 0		218. ALIVE 219. 1.00	218. DEAD 219. 2.00	218. TOTAL 219. -----	
220. EXPOSURE CONTROL	1.00	I 236	470 I 706	Control	
221. (VAR 1) CHEMICAL	2.00	I 636	1431 I 2067	Treated	
	TOTAL	I 872	1901 I 2773		

222. 0
223. MINIMUM NONZERO EXPECTED VALUE IS 222.009
224. ----- ALL STATISTICS ARE COMPUTED USING THE ORIGINAL CELL FREQUENCIES
225. EXCLUDING ROWS AND/OR COLUMNS WHICH ARE ZERO.

226. 0	STATISTIC PEARSON CHISQUARE	VALUE 1.725	D.F. 1	PROB. 0.1890	STATISTIC YATES' CORRECTED CHISQUARE	VALUE 1.604	D.F. 1	PROB. 0.2053
--------	--------------------------------	----------------	-----------	-----------------	-----------------------------------------	----------------	-----------	-----------------

227. 1 PAGE 3
228. 0BMDP1F - TWO-WAY FREQUENCY TABLES--MEASURES OF ASSOCIATION
229. HEALTH SCIENCES COMPUTING FACILITY
230. UNIVERSITY OF CALIFORNIA, LOS ANGELES 90024
231. PROGRAM REVISED NOVEMBER 1979
232. MANUAL REVISED -- 1979
233. COPYRIGHT (C) 1979 REGENTS OF UNIVERSITY OF CALIFORNIA

211.
 212.
 213.
 214.
 215.
 216. NUMBER OF OBSERVATIONS IN DATA SET = 48
 217. 1 STATISTICAL ANALYSIS SYSTEM 2
 218. 16:08 FRIDAY, FEBRUARY 6, 1981

219. GENERAL LINEAR MODELS PROCEDURE

220. DEPENDENT VARIABLE: RESPONSE

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE
MODEL	3	3509.22916667	1169.74305556	3.00
ERROR	44	17175.25000000	390.34659091	PR > F
CORRECTED TOTAL	47	20684.47916667		0.0407

R-SQUARE	C.V.	STD DEV	RESPONSE MEAN
0.169655	34.1992	19.75719087	57.77083333

SOURCE	DF	TYPE I SS	F VALUE	PR > F
VARIABLE	3	3509.22916667	3.00	0.0407

SOURCE	DF	TYPE IV SS	F VALUE	PR > F
VARIABLE	3	3509.22916667	3.00	0.0407

1 STATISTICAL ANALYSIS SYSTEM 3
16:08 FRIDAY, FEBRUARY 6, 1981

249. GENERAL LINEAR MODELS PROCEDURE

250. DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE RESPONSE

253. MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

255. ALPHA LEVEL=.05 DF=44 MS=390.347

GROUPING	MEAN	N	VARIABLE
A	64.833333	12	X 100 rpm
A	63.916667	12	Z 500 rpm
A	58.833333	12	W Con.
B	43.500000	12	Y 200 rpm

268. 1 STATISTICAL ANALYSIS SYSTEM 1
269. 16:08 FRIDAY, FEBRUARY 6, 1981

VARIABLE=W

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE	MAXIMUM VALUE	STD ERROR OF MEAN
RESPONSE	12	58.83333333	18.53661405	35.00000000	90.00000000	5.35105956
----- VARIABLE=X -----						
RESPONSE	12	64.83333333	19.31948302	30.00000000	94.00000000	5.57705436
----- VARIABLE=Y -----						
RESPONSE	12	43.50000000	22.71363227	13.00000000	91.00000000	6.55686081
----- VARIABLE=Z -----						

8
RESPONSE 12 58.83333333 18.53661405 35.00000000 90.00000000 5.35105956

Bobwhite Quail

